93 S611
PUBLIC LIBRARY
Technology

U. S. DEPARTMENT OF COMMERCE

Technical News Bulletin

of the

National Bureau of Standards

★ *Issued Monthly* ★

Washington | May 1945[1] | Number 337

CONTENTS

	Page
New edition of screw thread handbook	35
Calibration of arc lamps for testing colorfastness to light	36
Evaluation of analytical filter papers	36
Molecular weight of cellulose acetate	37
Polymolecularity and mechanical properties of cellulose acetate	37
Method for calculating the properties of hydrocarbons	37
Separation of hydrocarbons by adsorption	37
Standard samples of hydrocarbons	38
Heat losses from slab floors	38
Light weight aggregate concrete	39
Soundness test for hydrated limes	39
Modular planning of new building construction	39
Commercial standard for Douglas fir plywood	40
Commercial standard for electric-refrigeration condensing units	40
Materials and methods of X-ray protection	40
Further cooperation with Brazil in rubber research	40
New and revised publications issued during April 1945	41
Mimeographed material: Letter Circulars	42
Recent articles by members of the Bureau's staff published in outside journals	42

NEW EDITION OF SCREW THREAD HANDBOOK

The new edition of "Screw-Thread Standards for Federal Services," Handbook H28 (1944), may now be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 60 cents a copy. This represents a considerable expansion and partial revision of Handbook H28 (1942), which, in turn, superseded Handbook H25, published in 1939.

The standard American National thread series are republished without change, although the material relative to these series is rearranged and regrouped so that any pertinent item of information may be more readily found. Also certain tables are added, of limiting dimensions of gages, so that these data are now completely presented for all thread series. Gage tolerances for both regular and special threads are consolidated, and a summary table of formulas for determining gage dimensions is included.

In connection with the American National thread series, and special threads of American National form, it is to be noted that the manufacture of screw threads and thread gages for Army ordnance will continue to be governed by component and gage drawings issued by the Army Service Forces, which were based on Handbook H25. It is expected that revisions of such drawings, to be based on H28 (1944), will not be issued until after the present emergency. In other cases, unless there is definite necessity for continuing to follow previous specifications, H28 (1944) will govern.

The standard for pipe threads is expanded, the principal additions being the 1/16″–27 size, the Dryseal pipe threads, more detailed dimensions of both taper and straight pipe threads, and more nearly complete specifications for gages, including gages for hose coupling threads. The standard for pipe threads remains basically the same as previously, with some slight revision of maximum crest and root truncations. Of the specifications for special applications of taper pipe threads, those for compressed-gas cylinder valve outlet and neck connections are extended and a complete and improved gaging system is provided.

A major addition to the handbook consists of specifications for centralizing Acme threads. The general purpose Acme threads are revised somewhat, the principal change being the transfer of

[1] Published with approval of the Director of the Budget.

642125—45

the basic pitch diameter from the maximum screw to the minimum nut. Another important addition is the American War Standard for the American Truncated Whitworth thread series, which provides threads having flat crest and root truncations interchangeable with the British Standard Whitworth threads, but which are much more economically manufactured in this country than the British standard, which has rounded crests and roots.

Other additions deserving mention are a recommended standard basic thread form for buttress threads, and a list of symbols for designating the dimensions of taper-thread elements. Only minor additions or revisions of the dimensions of bolt heads, nuts, and screws occur, foremost of which is the addition of a standard for socket-head shoulder screws.

As with previous editions, the preparation of this edition was carried forward by the Interdepartmental Screw Thread Committee in close cooperation with various sectional committees, representing industry and users, organized under the procedure of the American Standards Association. The handbook has the approval of the Secretaries of War, Navy, and Commerce.

CALIBRATION OF ARC LAMPS FOR TESTING COLORFASTNESS TO LIGHT

Work has been in progress at the Bureau for several years on a reference standard lamp for testing colorfastness to light of textiles, paper, and similar materials, and on means for calibrating, in terms of this standard, the lamps used in laboratories throughout the country. The purpose is to provide a reliable method for expressing colorfastness to light in "standard fading hours."

Recently a survey was made of the relative fading abilities of some 46 lamps in 21 different laboratories, in order to arrive at an average value and to demonstrate the need for calibration. The standard lamp and proposed method of calibration are described briefly in the Bureau's Letter Circular LC785, and the results of the survey are given.

The survey was made by distributing test strips of paper dyed blue which were exposed for exactly 20 hours in each unit, and were then measured to determine the change in reflectance. The variation of from 0.405 to 0.092 found, reveals the great need for a standard means of calibrating the lamps.

In the proposed method of calibration, paper dyed blue made in the Bureau's experimental paper mill is used. A strip of the paper is exposed in the lamp for a suitable period of time, say for 20 hours. The strip is then compared visually with a strip of the same calibration paper that has been exposed in the reference standard lamp in steps of 16, 18, 20 and 22 standard fading hours. The time of exposure in the lamp being calibrated that is equivalent to one of the steps of exposure in the reference standard lamp can be determined in this simple manner within 10 percent or possibly better. Thus, the lamp can be calibrated in terms of the reference standard lamp and therefore in terms of any other similarly calibrated lamp. The calibration can be repeated as often as the particular installation requires. Laboratories desiring to try the paper will be supplied with unexposed test strips and with a book of strips which have been exposed in the reference-standard lamp for 16, 18, 20 and 22 hours. They will be asked to comment on their experience with the paper to guide any further work that seems necessary. Requests for the paper, and for LC785, which are furnished without charge, should be addressed to the National Bureau of Standards, Division VII–2, Washington 25, D. C.

EVALUATION OF ANALYTICAL FILTER PAPERS

As part of a Bureau investigation of analytical filter papers, having as its ultimate goal the development of standards of quality, a suitable testing procedure has been developed. The various tests included in this procedure are described and discussed by B. W. Scribner and W. K. Wilson in the May Journal of Research (RP1653).

The testing methods, which are related to the peculiar requirements of analytical filter papers, comprise tests for rate of flow of water, retention of fine precipitates, and content of ash. Measurement of the rate of flow of water through the papers was such an extensive project in itself that a separate report on this portion of the work was made by F. T. Carson and H. Bogaty in J. Research NBS 33, 353; (November 1944) RP1613 (Technical News Bulletin 331). A method for bursting strength of wet paper was also developed.

Other tests considered to be desirable for a thorough evaluation of the papers are thickness, weight per unit area, alpha cellulose, copper number, and acidity (pH). Standard methods are available for these determinations. From the thickness and weight, the dens-

ity can be calculated. The other tests are of importance because of their relation to the purity of the cellulose and the stability of the papers. As has been found at the Bureau for papers in general, filter papers that had become brittle on aging were characterized by low alpha cellulose and high copper number, evidences of degraded cellulose. These were acid-washed papers, and it is probable that the acid treatment was either too severe or that the acid, which is very destructive to paper, had not been entirely washed out. In some instances, brittle paper had a high acidity. Another consideration with respect to degraded cellulose is, that it is soluble in some solutions.

The tests are being applied to the various types and grades of papers of both foreign and domestic origin that are available at present, so as to obtain comprehensive data for standards of quality.

MOLECULAR WEIGHT OF CELLULOSE ACETATE

The intrinsic viscosities and osmotically estimated number-average molecular weights of a series of cellulose acetate fractions have been measured by Arnold M. Sookne, Research Associate, and Milton Harris, Director of Research, both of the Textile Foundation. As shown in RP1654 in the May Journal of Research, it was found that within the range of chain lengths investigated (number-average molecular weight, $\overline{Mn}$, up to 130,000) the number-average molecular weights are proportional to the intrinsic viscosities in acetone solutions, in agreement with Staudinger's rule and the results of Kraemer. An estimate is provided of the relative homogeneity with respect to molecular size of the fractions and the starting material from which they were prepared.

POLYMOLECULARITY AND MECHANICAL PROPERTIES OF CELLULOSE ACETATE

The tensile strengths, ultimate elongations, and folding endurances of films prepared from a series of cellulose acetate fractions and blends were studied by Arnold M. Sookne and Milton Harris. When the mechanical properties are plotted against the intrinsic viscosities (or relative weight-average degrees of polymerization) the results for the fractions and different blends fall on separate curves. In contrast, when the mechanical properties are plotted against the number-average degrees of polymerization, the results for the fractions and all of the blends fall approximately on a single curve for each property. The results, which will be published in full as RP1655 in the Journal of Research for May, are shown to be qualitatively consistent with the hypothesis that the mechanical properties of blends are the weight-averages of the properties of their components: i. e., Property blend= $(\Sigma w_i P_i)/\Sigma w_i$, where w_i is the weight of the molecular species with a mechanical property P_i. The results emphasize the importance of the determinations of the number-average degree of polymerization in studying commercial polymolecular materials.

METHOD FOR CALCULATING THE PROPERTIES OF HYDROCARBONS

In a report (RP1651) prepared by William J. Taylor, Joan M. Pignocco, and Frederick D. Rossini of the American Petroleum Institute Research Project 44 at the Bureau, and appearing in the May number of the Journal of Research, a method is described for calculating the properties of hydrocarbons which involves the summation of contributions from component parts of the molecule, together with contributions from interactions between adjacent component parts.

In the case of the paraffin hydrocarbons, the calculations were made in terms of the difference in the value of the property between a given normal paraffin and its isomers, and the required constants were evaluated from data on 33 paraffins, C_5 to C_8. For these paraffins, the average deviation of the calculated from the experimental values is ± 0.00074 g/ml in density; ± 0.00042 in refractive index (n_D at 20° C); and ± 0.55° C in the normal boiling point.

In the case of the monoolefin hydrocarbons, the calculations were made in terms of the difference in the value of the property between a given monoolefin and the corresponding paraffin having the same carbon skeleton, and the required constants were evaluated from data on 58 monoolefins, C_5 to C_7. For these monoolefins, the average deviation of the calculated from the experimental values is ± 0.0031 g/ml in density; ± 0.0020 in refractive index (n_D at 25° C); and ± 1.74° C in the normal boiling point.

SEPARATION OF HYDROCARBONS BY ADSORPTION

In RP1652 in the May Journal of Research, Beveridge J. Mair describes a new method for separating and de-

termining aromatic and monoolefin hydrocarbons in mixtures with paraffins and naphthenes by adsorption. The mixture to be analysed is introduced into the top of a column of silica gel. When the liquid level just reaches the top of the silica gel, a suitable desorbing liquid, such as ethyl alcohol, is added. The desorbing liquid forces the hydrocarbon portion down the column, during which passage the hydrocarbon portion is fractionated according to the adsorbability of the various components. These components issue from the bottom of the column in the following order: Paraffin plus naphthene, monoolefin, and aromatic hydrocarbons. The analysis is made by determining the fraction of the total volume constituted by each of these classes.

Results of the analyses of five solutions containing aromatic and paraffin hydrocarbons, and three solutions containing aromatic, monoolefin, and paraffin hydrocarbons are given. A procedure is outlined for determining the aromatic content of a straight-run petroleum distillate, as in the gasoline or kerosine fractions.

STANDARD SAMPLES OF HYDROCARBONS

Three of the Bureau's Standard Samples of hydrocarbons—Methylbenzene (toluene) No. 211a; 2,2,4-Trimethylpentane No. 217; and Methylcyclohexane No. 218—are now certified with respect to values of refractive index and density, and one of these—2,2,4-Trimethylpentane No. 217—also for calorimetric heat of combustion. Special certificates will accompany these samples.

Values of refractive index and density are given at 20°, 25°, and 30° C for air-saturated material at 1 atmosphere; those for refractive index to ±0.00002 at each of seven wavelengths—helium 6678 and 5016, hydrogen 6563 (C) and 4861 (F), mercury 5461 (e) and 4358 (g), and sodium 5893 (D); and those for density to ±0.00002 g/ml.

The certification for calorimetric heat of combustion, with values applicable to a bomb calorimeter, is primarily for use in establishing heating values of gasoline and other liquid fuels. This sample is available in a special 50-ml ampoule, in addition to the usual sizes.

NBS Standard Samples of hydrocarbons of known high purity have been prepared and certified for use in calibrating spectrometers and other analytical instruments and apparatus in the laboratories of the petroleum, rubber, chemical, and allied industries. Since the first group of 15 samples was announced (Technical News Bulletin 324, April 1944), additional hydrocarbons have been added, so that now 46 samples are available. The purity of each sample is stated in the certificate.

Because the prices originally set for the first group, as given in Technical News Bulletin 324, have since been found to be wholly inadequate to cover the cost of preparation and certification, these were revised as of December 1, 1944. Complete information on this point and on these samples in general, is obtainable from the Chemistry Division, National Bureau of Standards, Washington 25, D. C.

HEAT LOSSES FROM SLAB FLOORS

Results of a study of heat losses from slab floors have been released as Building Materials and Structures Report BMS 103, "Measurements of Heat Losses from Slab Floors," by R. S. Dill, W. C. Robinson, and H. E. Robinson. Slab floors are widely used in low-cost housing, and exact information concerning their heat-transfer characteristics is desirable.

In a structure specially designed for the purpose, four concrete floors were laid directly on the ground, and three concrete floors and one wood floor over crawl spaces, representing common types of construction. The floors, insulated from each other, were enclosed in separate compartments, the walls and ceilings of which were heavily insulated. Heat-transfer properties of these floors under varying conditions, as well as ground temperatures at different depths, down to 13 feet below the surface, are reported in the paper. In addition, factors based on these observations are suggested for estimating floor heat losses.

A summary of the measurements shows that the heat loss through the center of the floors laid on the ground is relatively small when the enclosing structure is continuously heated, that the heat loss is decreased by insulating the outside edges, and that, as regards warmth in winter, insulation at the exposed edges is more important than insulation under the center of floors of this type.

Of the floors laid over crawl spaces, the edge loss is found to be small for the wood floor, and, although this loss is considerable for a concrete floor insulated under the center, construction difficulties may make it impracticable to insulate the edges. It is further concluded that, as far as warmth or heat loss is concerned, a concrete floor may

as well be laid on the ground as over an unheated crawl space.

Copies of BMS103 are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 10 cents each.

LIGHT WEIGHT AGGREGATE CONCRETE

The desirable properties of light weight aggregate concrete—low cost, light weight, heat insulation value, and low shrinkage upon drying—are in part sacrificed if the concrete contains more cement than that needed to meet an essential requirement, such as strength. Despite this, the concrete for buildings often contains about six sacks of cement per cubic yard, which usually is more than is needed to attain the properties desired for the hardened concrete, and more than the amount commonly used for similar construction in Europe. The extra amount is added chiefly to improve the placeability of the concrete, thereby lowering the cost of placing and compacting, because leaner concretes are harsh and are not readily compacted.

Other methods of increasing the workability of lean concretes containing a light-weight burned-clay aggregate were investigated at the Bureau. Changes in the grading of the aggregate accomplished something, but a marked improvement was brought about by adding to the mixture a small amount of an organic compound that caused foaming during the mixing of the concrete and the entrainment of air. Concrete having only three sacks of cement per cubic yard had excellent workability when the entrained air was about 20 percent of the volume of the concrete. Such a concrete had a compressive strength of 500 lb/in.^{2}, which is sufficient for many uses, and possessed the other desirable properties associated with light-weight concrete.

SOUNDNESS TEST FOR HYDRATED LIMES

As stated last month, an investigation has been undertaken to develop an accelerated autoclave test for the purpose of differentiating hydrated limes which can cause a marked expansion, with resulting failure in the finish coat of plaster, from those giving little or no expansion. With the test procedure that has been developed, 57 different limes have been mixed with one brand of portland cement, cast into bars, and the expansion of the bars after autoclaving has been determined. In addition, 32 of the limes have been tested, in part with 18 other cements. A total of 148 determinations have been made.

It has been found that all of the "regular dolomitic hydrated limes" that have been causing trouble, regardless of the cements used, gave expansions ranging from 4.7 to 16.4 percent. When these dolomitic hydrated limes are properly hydrated and the free MgO reduced to 5 percent or less, net expansions were (with two exceptions) less than 0.5 percent, after deduction of the expansion of the cement used. The exceptions applied to those cements which gave the larger expansions when tested without the addition of the lime. Every high-calcium hydrated lime, regardless of the cement used, gave expansions less than 0.5 percent.

Thus it would appear that when the proper cement is used, a satisfactory autoclave test has been developed for determining the soundness of hydrated limes.

MODULAR PLANNING OF NEW BUILDING CONSTRUCTION

The Bureau has participated actively for some time in a project for coordinating dimensions of building materials and equipment and for correlating building plans and details with such dimensions. This promises to develop into a major factor in lowering the cost of construction and improving the quality of structures. Sponsored jointly by the American Institute of Architects and the Producers' Council, Inc., and carried on under the procedure of the American Standards Association, the project has the support of many manufacturers of building materials who plan to turn out their products in accordance with standardized dimensions that will make it possible for materials to be assembled in the finished structure with a minimum of cutting and fitting.

"Modular planning" is based on a 4-inch unit or "module" that serves as the spacing for a uniform three-dimensional grid to which the building layout and details are referenced. Its use is expected to lower construction costs by saving time for architects and engineers, by permitting a reduction in the number of sizes of parts that must be produced and kept in stock by manufacturers, by accelerating construction, and by reducing the possibility of error. Its principles are being applied to advantage by the city of New York in planning important postwar work.

COMMERCIAL STANDARD FOR DOUGLAS FIR PLYWOOD

Commercial Standard CS45–45, Douglas Fir Plywood (Sixth Edition), which has been in effect since January 27, 1945, has just been issued in printed form. This standard includes a new grade made especially for marine use. This has been brought about through the experience of the armed forces in the use of plywood for ship decking, planking, and for other marine applications during the past 2 years.

Plywood was used to a limited extent by the ancient Egyptians and Chinese, but it owes its present popularity to scientific control of the manufacturing process and the establishment of standard requirements and tests to insure uniformity of quality for the various grades.

The present edition of this standard covers detail requirements for six grades of moisture-resistant type and eight grades of exterior type Douglas fir plywood, as well as tests for these two types of bondage.

For those unfamiliar with the product, a chart is included showing the types and grades that are generally suitable for a large list of uses. Suggestions are given as to the correct method of ordering plywood. The pamphlet also shows facsimiles of the grade marks employed by members of the Douglas Fir Plywood Association to denote and identify the several grades and types.

Printed copies of CS45–45 may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 10 cents each.

COMMERCIAL STANDARD FOR ELECTRIC-REFRIGERATION CONDENSING UNITS

Commercial Standard CS107–45, Commercial Electric-Refrigeration Condensing Units, which has just been released, is a recorded voluntary standard of the trade, and comprises a revision and extension of the previous emergency standard CS (E) 107–43.

The standard covers requirements, rating, motor loading, and methods of testing air-cooled and water-cooled belt-driven commercial electric-refrigeration condensing units, in one-fifth to 5-horsepower sizes. It contains a list of standard equipment for all applications, including air-conditioning, covers minimum requirements for controls, shut-off valves, and receiver tank capacities, and provides a uniform method of guaranteeing compliance with the standard.

Joint recommendations of the industry on installation and service instructions are appended to the standard, which is to become effective six months after official announcement of cessation of hostilities.

The pamphlet is available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 10 cents a copy.

MATERIALS AND METHODS OF X-RAY PROTECTION

In Technical News Bulletin 335 (March 1945) on page 26 under "Mimeographed Material" there was listed Letter Circular LC779 entitled "Materials and Methods of X-Ray Protection." This was an error. The number was wrongly assigned to material intended for publication in one of the technical journals. When the article appears, it will be announced in the usual way in this Bulletin. In the meantime, no copies of the article are available for distribution.

FURTHER COOPERATION WITH BRAZIL IN RUBBER RESEARCH

The Brazilian Government, through the Department of State, has asked that the Bureau continue its collaboration with the Instituto Agronomico do Norte in Belem by the detail of Norman Bekkedahl as a consultant for a 2-month period this summer. Dr. Bekkedahl was loaned to the Instituto from November 1942 to November 1944 and during that time organized and equipped the Rubber Research and Testing Laboratory of the Instituto (Technical News Bulletin 332, December 1944).

The collaboration began about 3 years ago when the Brazilian Government was first setting up the Instituto Agronomico do Norte as part of a program aimed at making Brazil once more one of the major rubber-producing countries of the world. In competition with natural rubber from the Far East and synthetic rubber from the United States, wild rubber is not likely to be much of a factor in the postwar period. Considerable research is necessary before plantations can be successfully established in Brazil. Consequently the Brazilian Government asked Dr. Bekkedahl to serve as first chief of the Rubber Laboratory at the Instituto.

Dr. Bekkedahl was assisted in his mission by Frederick L. Downs, one-time member of the Bureau's staff and later an employee of the American Steel & Wire Co., Worcester, Mass., which granted him leave of absence for this

work. These two rubber technologists purchased for the Brazilian Government all the apparatus and machinery necessary for the Rubber Laboratory, had them shipped to Brazil, installed them, and put them into operation. During this 2-year period they also trained several Brazilian scientists in the operation of this laboratory.

The Rubber Laboratory is at present in operation, testing many samples of different types of rubbers and conducting research on various methods of processing the rubber from the latex.

The return of Dr. Bekkedahl for a 2-month period is desired for the purpose of orienting the future program of research at the Instituto and arranging for the installation of some additional equipment developed in the United States during the past three years.

While at the Rubber Laboratory of the Instituto and since his return to the Bureau Dr. Bekkedahl has been devoting attention to devising a system for the grading and evaluating of crude natural rubber. This plan has been discussed with rubber technologists of the major rubber companies of the United States and has met with a very favorable reception. The system is not yet fully worked out, however, and will be the subject of further investigation in both laboratories. The importance of such evaluation is becoming greater as the prospects of increased supplies of natural rubber develop.

NEW AND REVISED PUBLICATIONS ISSUED DURING APRIL 1945

Journal of Research [2]

Journal of Research of the National Bureau of Standards, volume 34, number 2, February 1945 (RP1631 to RP1637, inclusive). Price 30 cents. Annual subscription, 12 issues, $3.50.

Research Papers [2]

[Reprints from December 1944 and January 1945 Journal of Research]

RP1619. Some experimental data on the heats of combustion of benzoic acid and carbon (graphite). Edward J. Prosen and Frederick D. Rossini. Price 5 cents.

RP1621. Preparing refractory oxides, silicates, and ceramic materials for analysis, by heating with acids in sealed tubes at elevated temperatures. Edward Wichers, William G. Schlecht, and Charles L. Gordon. Price 5 cents.

RP1622. Use of sealed tubes for the preparation of acid solutions of samples for analysis, or for small-scale refining: Pressures of acids heated above 100° C. Charles L. Gordon, William G. Schlecht, and Edward Wichers. Price 5 cents.

RP1623. Analogy of hydrated calcium silicoaluminates and hexacalcium aluminate to hydrated calcium sulfoaluminates. E. P. Flint and Lansing S. Wells. Price 5 cents.

RP1624. Methods of measuring the coefficient of restitution and the spin of a ball. Lyman J. Briggs. Price 10 cents.

RP1625. Evaluation of the finish of a metal surface by a replica method. Henry K. Herschman. Price 10 cents.

RP1626. Wearing quality of some vegetable-tanned sole leathers. Robert B. Hobbs and Ruth A. Kronstadt. Price 10 cents.

RP1627. Frequency meter for use with Geiger-Müller counter. Leon F. Curtiss and Burrell W. Brown. Price 5 cents.

RP1628. Heats of formation and combustion of 1, 3-butadiene and styrene. Edward J. Prosen and Frederick D. Rossini. Price 5 cents.

RP1629. Heats of combustion of benzene, toluene, ethyl-benzene, *o*-xylene, *m*-xylene, *p*-xylene, *n*-propylbenzene, and styrene. Edward J. Prosen, Roger Gilmont, and Frederick D. Rossini. Price 5 cents.

RP1630. Panel tests for thermal spalling of fire-clay bricks used at high temperatures. R. A. Heindl and W. L. Pendergast. Price 15 cents.

Handbook [2]

H28 (1944). Screw-thread standards for Federal services. (Supersedes H28 (1942).) Price 60 cents.

Building Materials and Structures Reports [2]

[Persons who wish to be notified of new publications in the Building Materials and Structures series as soon as they are available should write to the Superintendent of Documents, Government Printing Office, Washington 25, D. C., asking that their names be placed on the special mailing list maintained by him for this purpose.]

BMS103. Measurements of heat losses from slab floors. Richard S. Dill, William C. Robinson, and Henry E. Robinson. Price 10 cents.

[2] Send orders for publications under this heading only to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Subscription to Technical News Bulletin, 50 cents a year; Journal of Research, $3.50 a year (to addresses in the United States and its possessions and to countries extending the franking privilege); other countries, 70 cents and $4.50, respectively.

Simplified Practice Recommendations [2]

R23–45. Plow bolts. (Supersedes R23.) Price 5 cents.
R31–45. Loaded paper shot shells. (Supersedes R31–44.) Price 5 cents.

Commercial Standards [2]

CS45–45. Douglas fir plywood. (Supersedes CS45–42.) Price 10 cents.
CS107–45. Commercial electric-refrigeration condensing units. Price 10 cents.
CS121–45. Women's slip sizes. (Woven fabrics.) Price 5 cents.

Technical News Bulletin [2]

Technical News Bulletin 336, April 1945. Price 5 cents. Annual subscription, 50 cents.

MIMEOGRAPHED MATERIAL

Letter Circulars

[Letter Circulars are prepared to answer specific inquiries addressed to the National Bureau of Standards, and are sent only on request to persons having a definite need for the information. The Bureau cannot undertake to supply lists or complete sets of Letter Circulars or send copies automatically as issued.]

LC781. Radio: Publications by the staff of the National Bureau of Standards. (Supersedes LC692.)
LC783. Books on Diesel engines.
LC784. Electrical interference with radio reception. (Supersedes LC660.)
LC785. Progress in calibration of arc lamps used in lightfastness testing.
LC786. List of commercial standards. (Supersedes LC776.)
LC787. House plan services. (Supersedes LC428.)
LC788. Leather: Publications by members of the staff of the National Bureau of Standards. (Supersedes LC667.)
LC789. Colorimetry, spectrophotometry, and photometry: Publications by the staff of the National Bureau of Standards for 1941 to 1944. (Supplementing LC628.)

RECENT ARTICLES BY MEMBERS OF THE BUREAU'S STAFF PUBLISHED IN OUTSIDE JOURNALS [2]

The textile chemist in the postwar world. Symposium at annual meeting, Am. Assn. Textile Chemists and Colorists, William D. Appel, presiding. Am. Dyestuff Reporter (440 Fourth Ave., New York 16, N. Y.) **34**, No. 1, 2 (January 1, 1945).

A survey of the synthetic fibers. William D. Appel. Am. Dyestuff Reporter **34**, No. 2, 21 (January 15, 1945).

Wet-strength papers for modern war maps. C. G. Weber. Chemical and Metallurgical Engineering (330 West 42d St., New York 18, N. Y.) **52**, No. 3, 109 (March 1945).

Advances in plastics during 1944. Gordon M. Kline. India Rubber World (386 Fourth Ave., New York 16, N. Y.) **111**, 694 (March 1945) and Mechanical Engineering (29 West 39th St., New York 18, N. Y.) **67**, No. 4, 255 (April 1945).

Replica method for evaluating finish of a metal surface. Harry K. Herschman, Mechanical Engineering **67**, No. 2, 119 (February 1945).

Increased use of pallets and their standardization. W. E. Braithwaite. Railway Purchases and Stores (9 South Clinton St., Chicago, Ill.) **38**, No. 2, 170 (February 1945) and Wholesale Grocer News (176 West Adams St., Chicago, Ill.) 55 (February 1945).

[2] These publications (unless otherwise stated) are not obtainable from the Government. Requests should be sent direct to the publishers.

U. S. GOVERNMENT PRINTING OFFICE: 1945

